REMARKS

Claims 1-8 remain present in this application.

Claims 1-8 stand rejected under 35 USC 103 as being unpatentable over Lee et al., "Fast head modeling for animation," in view of Migdal et al., U.S. Patent 6,208,347. This rejection is respectfully traversed.

Claim 1

Lee

Lee teaches a method to make individual faces for animation from several possible inputs. Lee presents a method to reconstruct a 3D facial model for animation from two orthogonal pictures taken from front and side views or from range data obtained from any available resource. Lee extracts features on a face in a semi-automatic way and modifies a generic model utilizing detected feature points. Fine modifications can be made after this generic modification, if range data is available. Automatic texture mapping is employed using an image composed from the two starting images, and the reconstructed 3D-face can be animated immediately with given expression parameters. Accordingly, in Lee, several faces by one methodology are applied to different input data to get a final animatable face.

Claim 1 of the present application teaches a computer-implemented method of reconstructing a regular 3D model by feature-line segmentation. Original 3D model data is inputted. 3D feature-lines are built according to the original 3D model data. The 3D feature-lines are converted into 3D threads having respective pluralities of connection joints, connection lines, and loops. Sample numbers of each connection line are determined, the loops are added or deleted, and the 3D threads are outputted. A regular triangular grid sample model is produced

according to the 3D threads. The regular triangular grid sample model is projected into the original 3D model to produce a reconstructed 3D model. Sample numbers for each connection line are re-determined, the loops are re-added or re-deleted, and steps (e) and (f) are repeated if the reconstructed 3D model does not satisfy resolution requirements, and the reconstructed 3D model is outputted if the reconstructed 3D model satisfies the resolution requirements.

Lee provides a 3D generic model with animation structure in and 2D frames used for the normalization and the feature detection (section 2.1). Lee applies feature detection from 2D image data (orthogonal picture images or texture image for range data), and then modifies the given generic model to obtain a rough match. The generic model is utilized in normalization and feature detection for different feature detection subjects. In addition, before the matching procedure is implemented, the given generic model is distinct from the feature detection subject.

In independent claim 1, on the contrary, the 3D feature-lines, 3D threads, and reconstructed 3D model reside in the same grid model surface. In addition, for each given range data, a reconstructed 3D model is determined according to features and structures of the given range data. In other words, the reconstructed 3D model is designed distinctively for each given data. The present invention has no "generic model."

Lee does not teach or suggest the reconstruction of a regular 3D model from an original 3D model, as is set forth in independent claim 1 of the present application and its dependent claims.

Midgal

The secondary reference to Midgal teaches a system and method for modeling 3D objects and 2D images by wireframe mesh constructions having data points that combine both spatial

data and surface information such as color or texture data. The use of the complex data points (e.g., X, Y, Z, R, G, B in 3D and x, y, R, G, B in 2D) allows the modeling system to incorporate both the spatial features of the object or image as well as its color or other surface features into the wireframe mesh. The 3D object models taught by Midgal do not require a separate texture map file for generating display or other object manipulations. In an exemplary embodiment, the mesh constructions taught by Midgal contain sufficient color information such that the triangles of the meshes can be rendered by any processor supporting linear or bilinear interpolation such as Gouraud shading. For 2D systems, the 2D mesh models created from the teachings of Midgal replace bitmap files and present a greater level of data compression and flexibility in image manipulation than is currently available in compression systems such as JPEG. In addition, the modeling system taught by Midgal has dynamic resolution capability, such that surface details like color or texture can be rapidly added or subtracted from the model.

Midgal provides a system and method for modeling 3D objects and 2D images by wireframe mesh constructions having data points that combine both spatial data and surface information such as color or texture data. The mesh construction taught by Midgal has nothing to do with feature lines.

On the other hand, in claim 1 of the present application, the reconstruction of a regular 3D model is built from feature-lines in an original 3D model. In addition, the reconstructed 3D model is locked in the same position despite resolution changes. This feature is very important, for various applications utilize position information of the reconstructed 3D model for further editing and/or setting control points. Midgal does not teach or suggest a locked-position reconstructed 3D model. Midgal also does not teach or suggest the reconstruction of a regular 3D

model from an original 3D model of claim 1, and therefore fails to teach or suggest the method of independent claim 1 and its dependent claims.

Claim 5

Lee

Lee teaches a method to make individual faces for animation from several possible inputs. Lee presents a method to reconstruct a 3D facial model for animation from two orthogonal pictures taken from front and side views or from range data obtained from any available resources. The method of Lee is based on extracting features on a face in a semiautomatic way and modifying a generic model with detected feature points. Fine modifications then follow if range data is available. Automatic texture mapping is employed using a composed image from the two images. The reconstructed 3D-face can be animated immediately with given expression parameters. According to Lee, several faces by one methodology are applied to different input data, in order to get a final, animatable face.

Claim 5 of the present application teaches a computer-implemented method of reconstructing a regular 3D model by feature-line segmentation. Original 3D model data is inputted, and 3D feature-lines are then built according to the original 3D model data. The 3D feature-lines are converted into 3D threads having respective pluralities of connection joints, connection lines, and loops. Sample numbers of each connection line are determined, the loops are added or deleted, and the 3D threads are outputted. A regular triangular grid sample model is produced according to the 3D threads, and the regular triangular grid sample model is projected into the original 3D model to produce a reconstructed 3D model. Sample numbers for each

connection line are re-determined, the loops are re-added or re-deleted, and steps (e) and (f) are repeated if the reconstructed 3D model does not satisfy resolution requirements, and the reconstructed 3D model is outputted if the reconstructed 3D model satisfies the resolution requirements.

Lee provides a 3D generic model with animation structure in and 2D frames used for the normalization and the feature detection (section 2.1). Lee applies feature detection from 2D image data (orthogonal picture images or texture image for range data), and then modifies the given generic model to provide a rough match. The generic model is utilized in normalization and feature detection for different feature detection subjects. In addition, before the matching procedure takes place, the given generic model is distinct from the feature detection subject.

In claim 5 of the present application, on the contrary, the 3D feature-lines and 3D threads, as well as the reconstructed 3D model, reside in the same grid model surface. In addition, for each given range data, a reconstructed 3D model is determined according to features and structures of the given range data. In other words, the reconstructed 3D model is designed distinctively for each given data. There is no "generic model" in the present application.

Lee does not teach or suggest the reconstruction of a regular 3D model from an original 3D model, as is set forth in independent claim 5 of the present application and its dependent claims.

Midgal

Midgal teaches a system and method for modeling 3D objects and 2D images by wireframe mesh constructions having data points that combine both spatial data and surface

information such as color or texture data. The use of the complex data points (e.g., X, Y, Z, R, G, B in 3D and x, y, R, G, B in 2D) allows the modeling system to incorporate both the spatial features of the object or image as well as its color or other surface features into the wireframe mesh. The 3D object models taught by Midgal do not require a separate texture map file for generating display or other object manipulations. In an exemplary embodiment, the mesh constructions taught by Midgal contain sufficient color information such that the triangles of the meshes can be rendered by any processor supporting linear or bilinear interpolation such as Gouraud shading. For 2D systems, the 2D mesh models created from the teachings of Midgal replace bitmap files and present a greater level of data compression and flexibility in image manipulation than is currently available in compression systems such as JPEG. In addition, the modeling system taught by Midgal has dynamic resolution capability, such that surface details like color or texture can be rapidly added or subtracted from the model.

Midgal provides a system and method for modeling 3D objects and 2D images by wireframe mesh constructions having data points that combine both spatial data and surface information such as color or texture data. However, the mesh construction taught by Midgal has nothing to do with feature lines.

In independent claim 5 of the present application, on the contrary, the reconstruction of a regular 3D model is built from feature-lines in an original 3D model. In addition, the reconstructed 3D model is locked in the same position despite resolution changes. This feature is very important, for various applications utilize position information of the reconstructed 3D model for further editing and/or setting control points. Midgal docs not teach or suggest a

locked-position reconstructed 3D model, and does not provide the described benefits of the claimed invention.

Midgal does not teach or suggest a locked-position reconstructed 3D model. Midgal also does not teach or suggest the reconstruction of a regular 3D model from an original 3D model of claim 5, and therefore fails to teach or suggest the method of independent claim 5 and its dependent claims.

Conclusion

Favorable reconsideration and an early Notice of Allowance are earnestly solicited.

In the event that any outstanding matters remain in this application, the Examiner is invited to contact the undersigned at (703) 205-8000 in the Washington, D.C. area.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to Deposit Account No. 02-2448 for any additional fees required under 37 C.F.R. §§ 1.16 or 1.17; particularly, extension of time fees.

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Respectfully submitted,

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